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Traffic Density Control and Accident Indicator Using WSN

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ABSTRACT

Now a day's many of the things get controlled automatically. Everything is getting controlled using the mechanical or the automated systems. In every field machines are doing the human works. But still some area is controlled manually. For example traffic controls, road control, parking controlling. Keeping these things in mind we are trying to develop the project to automate the traffic tracking for the square. To make any project more useful and acceptable by any organization we need to provide multiple features in a single project. Keeping these things in consideration proposed system is less with multiple methodologies which can be used in traffic control system It is important to know the road traffic density real time especially in mega cities for signal control and effective traffic management. In recent years, video monitoring and surveillance systems have been widely used in traffic management. Hence, traffic density estimation and vehicle classification can be achieved using video monitoring systems. In most vehicle detection methods in the literature, only the detection of vehicles in frames of the given video is emphasized. However, further analysis is needed in order to obtain the useful information for traffic management such as real time traffic density and number of vehicle types passing these roads. This paper presents emergency vehicle alert and traffic density calculation methods using IR and GPS

KEYWORDS: *Wireless Sensor Networks (WSN), Smart Traffic Light Control System (STLC)*

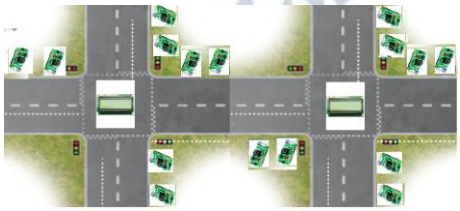
I. INTRODUCTION

Traffic Signal System or traffic monitoring is a vast domain where WSN can be applied to gather information about the traffic load on a particular road, incoming traffic flow, traffic load at particular period of time (peak hours) and in vehicle prioritization. Wireless Sensor Networks deployed along a road can be utilized to control the traffic load on roads and at traffic intersections. Sensors are deployed on either side of roads at intersection points and in emergency vehicles respectively. These sensors run on both solar energy as well as battery. During bright and sunny conditions these sensors have the capability to draw solar energy from sun light and use battery power for functioning during night and cloud and foggy condition Consider a scenario of highly congested area where many vehicles such as personal transport, public transport and emergency vehicles (Ambulance, Fire brigade, VIP cars and other rescue vehicles) have to wait for long for the change of traffic signals at intersection points. Existing traffic light systems have timers that are set at regular intervals. This leads to the wastage of precious time especially in case of rescue vehicles for emergency conditions. In order to control this situation, we have proposed a system consisting of two parts: Smart Traffic Light Control System (STLC) and Smart Congestion Avoidance System (SCA) during emergencies. STLC System controls the change of traffic lights at intersection points giving high priority to emergency vehicles. SCA System is a smart traffic routing system that chooses the shortest routes having the least congestions.

II. METHODOLOGY

The proposed system describes to overcome the problem of traffic jam on intersection at the Traffic Signal system is introduced. Here the first objective is to calculate the density of vehicle on the road for

flow traffic smoothly without congestion. Second objective is, developing Priority Based Signalling which helps to give the priority to the emergency vehicles. This approach is used to control the traffic smoothly. It is also helpful to overcome the traffic jam problem to reducing the delay problem and avoiding congestion. It also helps in providing the emergency services like Fire Brigade Vehicle, Ambulance or Police on pursuit at right time. Traffic Signal Management when properly designed, operated and maintained yields significant benefits like less congestion, saving fuel consumption. Vehicle emissions are also reduced and it also improves the air quality.



HARDWARE TOOLS:

1. POWER SUPPLY
2. ARDUINO UNO
3. IR SENSORS
4. VIBRATION SENSOR
5. LCD
6. ZIGBEE
7. GSM

A. ARDUINO UNO:

Arduino board and accessories is easily accessible to all users whether online or directly .In this modern technology, users can easily prepare kits at home. In terms of boards Arduino UNO is the perfect board to work on.

It's been described as an open source phase for electronics projects. It comprises of a microcontroller board that can be easily accessible interfacing using an analog to digital adapter or using powersupply.Its configuration describes its reliability and compatibility with other devices students can grab the latest version and information by just clicking our website.Online purchasing is also available with ease for students.

B. IR SENSORS:

Proximity ir sensors is used to detect objects and obstacles in front of sensor. Sensor keeps transmitting infrared light and when any objects comes near, it is detected by the sensor by monitoring the reflected light from the object. It can be used in robots for obstacle avoidance &line follower robot, for automatic doors, for parking aid devices or for security alarm systems, or contact less tachometer by measuring RPM of rotation objects like fan blades.

C. GSM MODULE:

Global system for mobile is a second generation cellular standard developed to cater.Voice services and data delivery using digital modulation.

GSM services:

Tele services: includes mobile phones, emerging calling etc.

Data services: IncludesSMS (short message service), fax, voice mail, electronic mail.

Supplementary services: I/C & O/G calls, call forwarding, call hold, call waiting, conference, etc.

D. LCD DISPLAY:

LCD- Liquid Crystal Display

Mostly used for display message. Highly user interactive. We are using 16*2 character LCD. 16*2 LCD means max 16 characters per line can be displayed and there are 2 lines.Single character is displayed in 5*7 pixel matrixRS,RW,E- to any pin of your choice. D0-D3- Not connected. D4-D7-PIN0-PIN3, RS-reset, RW-rewrite, E-enable, D3-D7-data line, Anode-+5v, Cathode-GND.

XBEE:

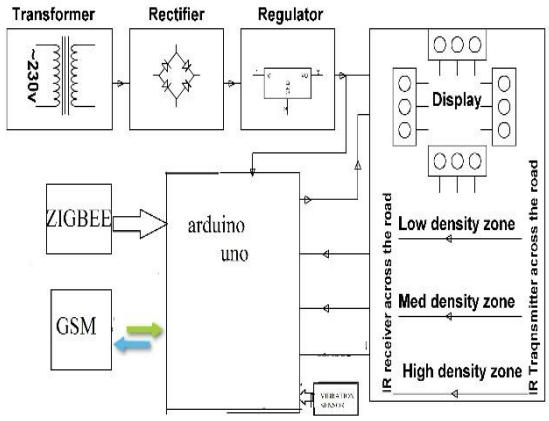
These are small radio modules that communicate with each other over radio using xbee protocol (built on top of the IEEE 802.15.4 standard, if you care). They allow for drop-in, drop-out mesh networking. New devices can be automatically detected. And existing devices can be removed without disrupting the entire system. Each radio can broadcast or can address specific other modules.

SMART TRAFFIC CONGESTION CONTROL USING WIRELESS COMMUNICATION:

The goal of intelligent traffic management systems is to achieve improvements in mobility, safety and productivity of the transport system through integrated application of advanced monitoring, communication, display and control process technologies both in the vehicle and on the road. The paper presents a method to Solve the problem of Invisibility of the traffic signal due to huge vehicles blocking the view. Prevent congestion caused at toll gates Give Collision Warning to the vehicles. A system comprising of a microcontroller, RF module and a traffic signal status display system is installed in every automobiles. The RF module installed in the vehicle is capable of transmitting and receiving

appropriate data which is controlled by the backend software algorithm in the microcontroller. Each road would be given a unique 5 bit address. Considering the range of the RF modules to be about 30 meters, the 5 bit unique address for the road can be repeated such that any two roads having the same road ID are not within 30 meters distance from each other. This gives the system a capability to address a region of any size. An alternative to this would be to increase the number of bytes to be wirelessly exchanged instead of a single byte.

III. Proposed System



When the sensors is sensed the traffic, then apply to the sensed information to display system through wireless using xbee technology, it will send.

Based on programming it will devided into three stages:

Stage1: it will display 0% traffic signal
Stage2: it will display 50% traffic signal
Stage3: it will display 100% traffic signal

IV. Conclusion and Future Work

This paper proposes a traffic control system using the WSN technology. The advantages of the proposed system include: 1) accurate monitoring and measurement of the vehicle number and vehicle speeds in real time due to the introduction of the WSN technology; 2) it is easy to append more functions to this system since the system not only know the statistical information but also the information of a special vehicle as well; and the roadside system can communicate with the vehicles. This paper also proposes a traffic control algorithm for the signal control in an intersection. Since the vehicle state is monitored dynamically, the phase time is determined exactly instead of by forecasting. Compared with conventional algorithm, the advantages of the algorithm includes: 1) eliminate the phase time when no vehicle passing across; 2) Let all of the waiting vehicles pass if possible, which reduces the waiting time.

Future Scope:

Here the two objectives, that are, first, calculating the density of the vehicle on the road for the flow of the traffic smoothly without congestion and second, developing SMS Based Signalling which will help to when accident occurred at the traffic junction. This Traffic Signal Management approach when properly designed, operated and maintained yields significant benefits like less congestion, saving fuel consumption. The proposed approach will consider not only the priority of the vehicles but also the density of the vehicles on the road and also will control the traffic light sequence efficiently and more accurately and the accuracy of the GPS is more than that of a Camera. This system aims at saving a large amount of man-hours caused by traffic problems and accidents, where prevention can save lives and property. It is able to manage priority emergency tag vehicles.

A design and implementation of a VHDL-based 32bit unsigned multiplier with CLAA and CSLA was presented. VHDL, a Very High Speed Integrated Circuit Hardware Description Language, was used to model and simulate our multiplier. Using CSLA improves the overall performance of the multiplier. Thus a 31 % area delay product reduction is possible with the use of the CSLA based 32 bit unsigned parallel multiplier than CLAA based 32 bit unsigned parallel multiplier.

This 32 bit multiplier can be further extended to 64 bit multiplier and 128 bit multiplier using the proposed method for multiplication operation can be done as future work.

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